Engineering & Technology Middle School

The Following are Middle School Courses offered under Engineering & Technology for the year 2013 & 14 year.

Course Number	Course Title	Course Description	Low Grade	High Grade	Credits	Population	Content
210101	**Invention & Innovation (ITEEA)**	This course provides students with opportunities to apply the design process in the invention or innovation of a new product, process, or system, In this course, students will learn all about invention and innovation. They will have opportunities to study the history of Invention and Innovations, including their impacts on society. They will learn about the core concepts of technology, and about the various approaches to solving problem, including engineering design and experimentation. Students will apply their creativity in the invention and innovation of new products, processes, or systems, Finally students learn about how various Invention and Innovations impact their lives. Students participate in engineering-design activities to understand how criteria, constraints, and processes affect designs. Students are involved in activities where they learn about brainstorming, visualizing, modeling, constructing, testing, experimenting, and refining designs. Students also develop skills in researching for information, communicating design information, and reporting results. This course will make extensive use of a laboratory environment through a variety of instructional strategies. Instruction can be enriched through participation in Kentucky Technology Student Association challenges. This course may be 6 to 18 weeks in duration.	6	8		General	Engineering/Technology

210102	**Invention & Innovation (ITEEA)**	This course provides students with opportunities to apply the design process in the invention or innovation of a new product, process, or system, In this course, students will learn all about invention and innovation. They will have opportunities to study the history of Invention and Innovations, including their impacts on society. They will learn about the core concepts of technology, and about the various approaches to solving problem, including engineering design and experimentation. Students will apply their creativity in the invention and innovation of new products, processes, or systems, Finally students learn about how various Invention and Innovations impact their lives. Students participate in engineering-design activities to understand how criteria, constraints, and processes affect designs. Students are involved in activities where they learn about brainstorming, visualizing, modeling, constructing, testing, experimenting, and refining designs. Students also develop skills in researching for information, communicating design information, and reporting results. This course will make extensive use of a laboratory environment through a variety of instructional strategies. Instruction can be enriched through participation in Kentucky Technology Student Association challenges. This course may be 6 to 18 weeks in duration.		9	.5	General	Engineering/Technology

210103	**Technological Systems (ITEEA)**	This course is intended to teach students how technological systems work together to solve problems and capture opportunities. A system can be as small as two components working together (technical system/device level) or can contain millions of interacting devices (use system/network level). We often break down the macro-systems into less complicated micro-systems in order to understand the entire system better. However, technology is becoming more integrated, and systems are becoming more and more dependent upon each other than ever before. Electronic systems are interacting with natural (i.e., biological) systems as humans use more and more monitoring devices for medical reasons. Electrical systems are interacting with mechanical and fluid-power systems as manufacturing establishments become more and more automated. This course will give students general background on the different types of systems but will concentrate more on the connections between these systems. The goals of this course can be accomplished in a laboratory environment through a variety of instructional strategies. Instruction can be enriched through participation in Kentucky Technology Student Association challenges. This course may be 6 to 18 weeks in duration.	6	8		General	Engineering/Technology

210104	**Technological Systems (ITEEA)**	This course is intended to teach students how technological systems work together to solve problems and capture opportunities. A system can be as small as two components working together (technical system/device level) or can contain millions of interacting devices (use system/network level). We often break down the macro-systems into less complicated micro-systems in order to understand the entire system better. However, technology is becoming more integrated, and systems are becoming more and more dependent upon each other than ever before. Electronic systems are interacting with natural (i.e., biological) systems as humans use more and more monitoring devices for medical reasons. Electrical systems are interacting with mechanical and fluid-power systems as manufacturing establishments become more and more automated. This course will give students general background on the different types of systems but will concentrate more on the connections between these systems. The goals of this course can be accomplished in a laboratory environment through a variety of instructional strategies. Instruction can be enriched through participation in Kentucky Technology Student Association challenges. This course may be 6 to 18 weeks in duration.		9	.5	General	Engineering/Technology
210105	**Special Technology Topics**	Special Technology Topics allows the teacher to develop a course for in-depth exploration of technological topics. This course will allow students to gain a more comprehensive knowledge of a particular technology topic or explore specialized technology careers. This can be accomplished in a laboratory environment through a variety of instructional strategies. Instruction can be enriched through participation in Kentucky Technology Student Association challenges and/or Project Lead the Way-Gateway to Technology program materials. This optional/additional course may be 6 to 18 weeks in duration and may be taught at any grade level as appropriate	6	8		General	Engineering/Technology

210106	**Special Technology Topics**	Special Technology Topics allows the teacher to develop a course for in-depth exploration of technological topics. This course will allow students to gain a more comprehensive knowledge of a particular technology topic or explore specialized technology careers. This can be accomplished in a laboratory environment through a variety of instructional strategies. Instruction can be enriched through participation in Kentucky Technology Student Association challenges and/or Project Lead the Way-Gateway to Technology program materials. This optional/additional course may be 6 to 18 weeks in duration and may be taught at any grade level as appropriate		9	.5	General	Engineering/Technology
210119	**Exploration of Power Energy & Transportation Technology**	This course and/or modules allows for exploration in the many phases of Power Energy and Transportation through hands-on activities and/or modules. This program of study facilitates STEM principles to be applied in real world situations. These units or modules make up areas of the basic core technology such as but not limited to, Aviation and Aerospace, Transportation Systems, Robotics Pneumatic/Hydraulic, Power and Energy, Mechanical, Electrical/Electronics and Research.	6	8		General	Engineering/Technology
210120	**Exploration of Manufacturing Technology**	An exploratory course and/or modules designed to investigate the types of activities performed in the manufacturing industry and through laboratory experiences students explore the skills and technologies of these industries. Content includes the application of technology; the design of products and services; emerging and innovative technologies; safety and maintenance of technology; marketing; technology-related; and career explorations. Activities may include computer aided design mechanical drafting, manufacturing parts, CNC programming, computer control, and robotics while tools and machines, and planning manufacturing projects.	6	8		General	Engineering/Technology

210121	**Exploration of Construction Technology**	An exploratory course and/or modules designed to investigate the types of activities performed in the construction industry and through laboratory experiences students explore the skills and technologies of this industry. Content includes the application of technology; the design of products and services; emerging and innovative technologies; safety and maintenance of technology; marketing; and technology-related career explorations. Activities may include computer aided design, mechanical drafting, building models of buildings, specific projects, using construction tools and machines, and designing and building simple structures.	6	8		General	Engineering/Technology
210122	**Exploration of Computer and Graphic Communication Technology**	An exploratory course and/or modules designed to provide students the skills and knowledge that are performed in the computer and communication industries. The types of activities may include but not limited to developing images, photography, desktop publishing, computer aided design, mechanical drafting, and printing, computer animation, sublimation, screen printing, bindery, audio/video production, and file management through laboratory experiences	6	8		General	Engineering/Technology
210127	**Exploring Technology (ITEEA)**	Students develop an understanding of the progression and scope of technology through exploratory experiences. In group and individual activities, student experience ways in which technological knowledge and processes contribute to effective design and solutions to technological problems. Students participate in design activities to understand how criteria, constraints, and processes affect designs. Brainstorming, visualizing, modeling, constructing, testing, and refining designs provide first hand opportunities for students to understand the uses and impacts of innovations. Students develop skills in communicating design information and reporting results. Instructional design may utilize modular or other instructional strategies. Participation in Kentucky Technology Student Association will greatly enhance instruction. This course may be 6 to 18 weeks in duration.	6	8		General	Engineering/Technology

210128	**Exploring Technology (ITEEA)**	Students develop an understanding of the progression and scope of technology through exploratory experiences. In group and individual activities, student experience ways in which technological knowledge and processes contribute to effective design and solutions to technological problems. Students participate in design activities to understand how criteria, constraints, and processes affect designs. Brainstorming, visualizing, modeling, constructing, testing, and refining designs provide first hand opportunities for students to understand the uses and impacts of innovations. Students develop skills in communicating design information and reporting results. Instructional design may utilize modular or other instructional strategies. Participation in Kentucky Technology Student Association will greatly enhance instruction. This course may be 6 to 18 weeks in duration.		9	.5	General	Engineering/Technology
		Project Lead the Way Middle School Program of Study Requires PLTW Agreement to offer program and Require teacher training					
219909	**Design & Modeling (GTT)**	In this **Gateway To Technology** course uses solid modeling (a very sophisticated mathematical technique for representing solid objects) to introduce students to the design process. Utilizing this design approach, students understand how solid modeling has influenced their lives. Students also learn sketching techniques, and use descriptive geometry as a component of design, measurement, and computer modeling. Using design briefs or abstracts, students create models and documentation to solve problems. **PLTW Agreement Required to offer course.**	6	8		General	Engineering/Technology
219910	**Automation & Robotics** **(GTT)**	In this **Gateway To Technology** course students will trace the history and development of automation and robotics. They learn about structures, energy transfer, machine automation, and computer control systems. Students acquire knowledge and skills in engineering problem solving and explore requirements for careers in engineering. **PLTW Agreement Required to offer course.**	6	8		General	Engineering Technology

219911	**Science & Technology**	In this **Gateway to Technology** course students will trace how science has affected technology throughout history. Students learn about the mechanics of motion, the conversion of energy, and the use of science to improve communication. **PLTW Agreement Required to offer course.**	6	8		General	Engineering Technology
219912	**Flight & Space**	In this **Gateway To Technology** course students learn about the history of flight through hands-on activities, research, and a presentation in the form of an infomercial. In the Aeronautics unit students learn the science and art of flying through the air. Students will experience activities related to Newton's laws, Bernoulli's principle, wind tunnels, airfoils, and propulsion systems. Students will complete activities while learning about the history and principles of space travel. They will study the development of rocketry and the space program. **PLTW Agreement Required to offer course.**	6	8		General	Engineering/Technology
219913	**Magic of Electrons**	In this course students explore the science of electricity, the movement of atoms, circuit design, and sensing devices. Students acquire knowledge and skills in basic circuitry design and explore the impact of electricity on our lives. **PLTW Agreement Required to offer course.**	6	8		General	Engineering Technology
219914	**Energy & the Environment**	In this **Gateway To Technology** course students investigate the impact of energy on our lives and the environment. They design and model alternative energy sources and participates in an energy expo to demonstrate energy concepts and innovative ideas. Students evaluate ways to reduce energy consumption through energy efficiency and sustainability. **PLTW Agreement Required to offer course.**	6	8		General	Engineering Technology
219915	**Green Architecture**	In this **Gateway To Technology** course students investigate the concept of "being green" in a world of reduced resources and environmental challenges will be experienced by the next generation of designers and builders. Students are introduced to architectural plans, construction styles, alternative materials and processes, dimensioning, measuring and architectural sustainability. Students use a 3D architectural software program to create an environmentally friendly home using shipping containers. **PLTW Agreement Required to offer**	6	8		General	Engineering/Technology

	Medical Detectives	Medical Detectives (MD) explores the biomedical sciences through hands-on projects and labs that require students to solve a variety of medical mysteries. Students investigate medical careers, vital signs, diagnosis and treatment of diseases, as well as human body systems such as the nervous system. Genetic testing for hereditary diseases and DNA crime scene analysis put the students in the place of real life medical detectives.	6	8		General	Engineering Technology